

CLAIM AMENDMENTS

1 1. (currently amended) A method of machining a hollow
2 metal workpiece having a plurality of ~~small-diameter~~ throughgoing
3 holes and at least one ~~large-diameter hole port~~, the method
4 comprising the steps of:

5 picking up from a transfer station by a grab [[a]] the
6 hollow workpiece and displacing the workpiece from the transfer
7 station to a machining station;

8 thereafter, while holding the workpiece in the machining
9 station with the grab,

10 a) engaging a tool from outside with a first
11 exterior surface of the workpiece and
12 thereby finishing the first exterior
13 surface;

14 b) reorienting the workpiece by the grab and
15 engaging a second tool with a second
16 exterior surface of the workpiece offset
17 from the first exterior surface and
18 thereby finishing the second exterior
19 surface;

20 c) fitting another a third tool through the
21 ~~large-diameter holes port~~ of the workpiece
22 and positioning the [[other]] third tool
23 inside the workpiece adjacent one of the
24 small-diameter holes;

25 d) coupling a drive spindle through the one
26 small-diameter holes hole of the workpiece
27 with the [[other]] third tool and
28 machining an inner surface of the
29 workpiece adjacent the one small-diameter
30 holes hole with the [[other]] third tool;
31 and

32 e) repeating steps b), c), and d) to finish
33 another interior surface of the workpiece
34 adjacent another of the small-diameter
35 holes; and

36 displacing the workpiece from the machining station back
37 to the transfer station and releasing it from the grab.

1 2. (currently amended) The machining method defined in
2 claim 1 wherein the first and second exterior surfaces are both
3 surfaces of the small-diameter holes.

1 3. (currently amended) The machining method defined in
2 claim 2 wherein the surfaces of the small-diameter holes are
3 generally cylindrical.

1 4. (currently amended) The machining method defined in
2 claim 1 wherein in step b) the workpiece is positioned by being
3 rotated about an axis through about 90°.

1 5. (currently amended) The machining method defined in
2 claim 1, further comprising the step during step d) of
3 engaging a tailstock through another of the small-
4 diameter holes with the [[other]] third tool after coupling of the
5 [[other]] third tool to the drive spindle to brace the [[other]]
6 third tool.

1 6. (withdrawn; currently amended) An apparatus for
2 machining a hollow metal workpiece having a plurality of small-
3 diameter throughgoing holes and at least one large-diameter holes
4 port to produce a part having a plurality of finished exterior and
5 interior surfaces, the apparatus comprising:
6 means including a grab for picking up from a transfer
7 station the hollow workpiece and displacing the workpiece from the
8 transfer station to a machining station;

9 means including a first tool engageable with a first
10 exterior surface of the workpiece in the grab and in the machining
11 station for finishing the first exterior surface;

12 drive means connected to the grab and for reorienting the
13 workpiece in the machining station and engaging [[the]] a second
14 tool with a second exterior surface of the workpiece offset from
15 the first exterior surface and thereby finishing the second
16 exterior surface;

17 means including for fitting another a third tool through
18 the large-diameter holes port of the workpiece and positioning the

19 [[other]] third tool inside the workpiece adjacent one of the
20 small-diameter holes;

21 means including a drive spindle engageable through the
22 one small-diameter hole of the workpiece for coupling the spindle
23 to the [[other]] third tool and machining an inner surface of the
24 workpiece adjacent the one small-diameter holes hole with the
25 [[other]] third tool; and

26 means for displacing the workpiece from the machining
27 station back to the transfer station and releasing it from the
28 grab.

1 7. (withdrawn; currently amended) The machining
2 apparatus defined in claim 6, further comprising
3 a tailstock engageable through another of the small-
4 diameter holes with the [[other]] third tool after coupling of the
5 other tool to the drive spindle to brace the [[other]] third tool.

1 8. (withdrawn) The machining apparatus defined in claim
2 7 wherein the tailstock is displaceable parallel to a rotation axis
3 of the spindle.

1 9. (withdrawn) The machining apparatus defined in claim
2 6 wherein the tools are all rotatable about parallel axes, the
3 means including the grab further including:

4 a main slide displaceable perpendicular to the rotation
5 axes; and

6 a carriage displaceable on the main slide parallel to the
7 rotation axes and carrying the grab.

1 10. (new) The machining apparatus defined in claim 1,
2 further comprising after step b) and before step c) the step of:
3 b') shifting the workpiece from the first-mentioned
4 machining station to a second machining station offset therefrom by
5 means of the grab;
6 step c) being carried out in the second machining station, the
7 workpiece being displaced after step d) from the second machining
8 station back to the transfer station.